DuPont Toxics Citizen Oversight Project
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April 23, 2003

Mr. Mike Blum
Unit Supervisor, Toxics Cleanup Program
Washington State Department of Ecology
Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775

Re: Review Comments Draft Final Site Cleanup Documents for the DuPont Works Site

Dear Mr. Blum,

The DuPont Toxics Citizens Oversight Project (DTCOP) is hereby providing formal comments regarding the proposed cleanup actions at the former DuPont Works site. The DTCOP is the recipient of a Public Participation Grant from the Department of Ecology and has utilized those funds to obtain assistance from technical experts in completing this review. Our technical consultants for this project, John Littler P.E. and Greg Glass, have provided the DTCOP with input resulting in the comments discussed below. The scope of this assistance has included the following objectives:

1. To help the community understand the documents and site proposals.

2. To provide support for citizen participation in alerting Ecology to issues of concern for the community.

3. To provide an independent technical review of the documents.

4. To assist in the approval of a reasonable and sufficient site cleanup to meet community needs.

As you know the grant funding has provided resources to provide input at several earlier stages of the project. Although there are a number of significant issues which this letter addresses in the following comments, it is appropriate to acknowledge at this time that many of the comments and concerns arising from our review of earlier cleanup proposals have been addressed in the most recent documents provided for review.

During this review process the following documents were reviewed:

- Draft Final Remedial Investigation Report for the Former DuPont Works Site, Pioneer Technologies Corporation, January 2003.

- Draft Final Human and Ecological Health Risk Assessment for the Former DuPont Works Site, Pioneer Technologies Corporation, January 2003.

- Draft Final Feasibility Study for the Former DuPont Works Site, West Shore Corporation, January 2003.

- Draft Final Cleanup Action Plan for the Former DuPont Works Site, West Shore Corporation NW and Pioneer Technologies Corporation, January 2003

- Draft Consent Decree

- Interim Source Removal Actions: On Site Stockpiles Report at the Former DuPont Works Site, Pioneer Technologies Corporation and West Shore Corporation January 28, 2001.

- Draft Interim Corrective Actions Report Foundations, Narrow Gauge Railroad and Hot Spots at the Former DuPont Works Site, Pioneer Technologies Corporation, West Shore Corporation and URS, Inc., April 22 2002.

In addition several meetings with WDOE staff, representatives of the PLPs and the community took place including:

- WDOE Informational Workshop on February 12th at DuPont City Hall.

- Meeting with WDOE staff on March 5th to discuss preliminary comments.

- Meeting with PLPs and WDOE on March 12th to discuss preliminary comments.

- WDOE Public Hearing on March 12th at DuPont City Hall.

- A Community Forum hosted by DTCOP on March 19th.

The discussions held with WDOE and PLP representatives were very helpful in providing clarification regarding several of the following comments. Most of the discussion at the public meetings focused on questions related to clarification of issues, rather than actual community concerns as was the case at earlier project stages.

Our comments are organized into 2 groups. The first group is Primary Technical Review Comments and is the most significant, addressing the following types of issues: technical, MTCA policy and consistency, risk assessment, groundwater

questions and final site cleanup methodologies. The second group is Editorial Comments addressing a number of document inconsistencies most suitable for consideration as editorial in nature and which we believe are largely the result of meshing information from a number of complex site documents, including technical reports and memoranda and policy determinations, produced over the past 10 years.

Please note that the second group does not represent an exhaustive review for editorial quality and consistency, but this group of comments has been provided to assist in eliminating inconsistencies as the final documents are produced. We recommend that a comprehensive editorial review to address items of this nature be completed by the authors of the reports before final publication.

As many of these comments are not limited in their scope to any single document they are not presented on a document by document basis.

Primary Technical Review Comments.

1. Elevated ground water concentrations for DNT continue to be reported over 7 years after completion of the most recent Interim Source Removal (ISR) cleanup actions for known source areas of DNT (1992 to 1995). In addition there have been notable peaks and valleys in the observed levels but there are no clear trends apparent. The fact that on going elevated levels continue to be observed several years after the ISRs with no clear downward trend implies an on going source(s) as yet unremediated may still exist.

   Using the average estimated aquifer flow rate (reported in the FS for the purpose of pump and treat evaluation as ranging from 3,500 gpm to 7,000 gpm) of 5,250 gpm and, for illustration purposes, the value of observed DNT from the existing monitoring wells of 0.25ug/l (mid range based on the presented RI data although we understand the most recent data show increased levels) yields an annual DNT discharge from the site of about 5.8 pounds of DNT. If the most recent site groundwater monitoring data reflects higher levels then higher overall site DNT discharge would also be indicated proportionately.

   There is no analysis or discussion presented in the documents regarding this issue and what type or size of source would be necessary to produce the observed effect of elevated DNT levels. It is apparent that if shallow sources associated with the soils to be scraped exist they would be removed during the planned remediation, but any material which has migrated into deeper soils or is buried deeper than the excavation depths would not necessarily be detected in the planned confirmation monitoring. Therefore we recommend that this issue be evaluated further in the context of the additional planned monitoring activities and periodic WDOE

reviews after the remedial action has been completed, as discussed further below.

2. Discussion of natural restoration for the aquifer system in the documents is limited to a statement that this will occur. There is no basis for this conclusion presented, and it appears overstated without further justification provided in the documents. The reports do not provide an estimated restoration timeframe for ground water, which under the natural attenuation (no action) alternative will be accomplished largely through the high flushing capacity of the ground water at the site. Given a high aquifer flushing capacity, continuing elevated DNT concentrations in ground water during compliance monitoring, without a confirmed downward trend, would be inconsistent with all significant DNT sources already having been removed.

   At a minimum the basis for this conclusion should be developed and an approach developed to evaluating it further in the context of the required future WDOE periodic reviews. We are not recommending a comprehensive fate and transport modeling approach to this topic at this time. However we do recommend that the subject be evaluated and discussed to address the questions raised in these comments.

   Degradation of TNT to DNT in soils could also be implicated as a secondary source of DNT. Ecology should identify a timeframe and trigger levels to address the implementation of contingent actions should significant DNT levels continue to be observed. Since property development activities in possible source areas may make further investigations difficult or impossible, the schedule for such development activities should also be considered in selecting the timeframe for further investigations or groundwater evaluations.

   We note that the network of groundwater monitoring locations for the site is not comprehensive and we recognize that in an aquifer system of this nature (high volumes of flow and rapid flow velocities) it is difficult to monitor at a high level of precision. The new monitoring well in its proposed location (relative to DNT contaminated soils formerly removed) may provide meaningful information on this issue.

   Recognizing that the assumption that natural restoration will be effective, along with the currently relatively low observed levels, at the site is key to the selected option of no active groundwater remediation being implemented, it is important to address the issues raised in the preceding paragraphs.

   As a result we suggest a thorough groundwater quality assessment of the DNT occurrences and trends 2 years after completion of the scraping project. If there is no clear downward trend after a few years of additional monitoring then the implication would be that an ongoing source exists, at which point additional contingent actions as discussed below should be considered. If an ongoing source exists its nature could result in pulsing or ebbing and flowing of

contaminant releases (e.g.: a deteriorating drum exposed to increased or fluctuating levels of water percolation resulting from scraping or construction activity could result in releases occurring intermittently).

The timing of such a groundwater quality assessment (not necessarily limited to DNT analyses alone) should take into consideration the condition of the site and recent site activity. It is not clear what effect, if any, changes in site surface conditions will create in groundwater quality. In general it can be expected that during and immediately following construction activity elevations in groundwater contaminants will potentially be observed. Conversely as site development continues and larger areas are effectively covered with impervious surfaces such as buildings, roads and parking lots the potential exists to reduce mobilization of contaminants by reducing the potential for leaching. These issues should be considered in the groundwater quality assessment process.

3. Whereas we do not take issue with the determination of impracticablity of aquifer restoration by pump and treat mechanisms for this aquifer system, we do believe that contingency planning is appropriate to address the DNT issue should elevated levels continue to be seen with no downward trend. Future contingency actions should consider steps such as:

   a. Additional groundwater monitoring and data analysis to more accurately identify problem areas and groundwater quality trends.

   b. Further focused source investigation based on the results of additional monitoring to identify source areas and land development impacts (positive or negative).

   c. Source removal actions if discrete sources are identified.

   d. Focused pump and treat efforts to address limited localized groundwater problem areas.

   It is possible that a determination could be made by WDOE in the future that elevated groundwater levels exist but not at levels severe enough to warrant further remediation efforts or that alternatives for further action are impractical. Such a determination would be based on a satisfactory determination by the PLPs and a thorough assessment of current site groundwater quality information.

4. Ground water compliance monitoring is proposed based on one sampling event per year per monitoring well. We understand that the available ground water monitoring database will be used to identify the season of peak DNT concentrations in ground water, and that compliance monitoring samples will be collected only in that identified season. Given the length of the available record and variability in ground water DNT concentrations, seasonal patterns or trends for DNT still appear uncertain at this time.

We recommend that Ecology require quarterly ground water monitoring for DNT at the 6 compliance monitoring wells for the first two years. If those additional data identify trends, that would be very helpful in the groundwater quality assessment process or if the data confirm the identification of the season with highest DNT levels, further ground water sampling could focus on that season. If not, Ecology can adapt the schedule for ground water sampling to provide broader seasonality data (e.g., by continuing quarterly sampling or invoking a rotating season schedule of sampling every 3 or 5 quarters).

5. An oral cancer potency factor of 0.68 $(mg/kg\text{-}day)^{-1}$ for mixed DNT is listed in Ecology's CLARC manual. That oral CPF is used in the reports to calculate a screening value of 0.13 ug/L for ground water based on a drinking water exposure pathway (e.g., see DCAP Table 4-1). In an apparent omission, the CLARC manual does not use the oral cancer potency factor for mixed DNT to calculate a cancer risk-based cleanup level for soils. Unless there is a strong rationale (e.g., an explanation given in the IRIS file) for why the oral cancer potency factor should not apply to ingested soils as well as ingested drinking water, the CPF of 0.68 $(mg/kg\text{-}day)^{-1}$ should be used to calculate cleanup levels and remediation levels for DNT in soils based on cancer risks, and the text and tables revised accordingly. The default MTCA Method B cleanup level for soils would be 1.5 ppm.

6. The HHRA evaluations of soils data for the 4 open space exposure (remediation) units demonstrate that the targeted acceptable risk levels for human health are exceeded in all 4 units (see HHRA Table 4-7). The selected cleanup alternative for all 4 open space remediation units is No Action; see DCAP section 6.1.3. (The justification statement at DCAP section 6.1.3 states incorrectly that these areas meet cleanup standards for the protection of human health, contrary to the HHRA results). Since acceptable risk levels are exceeded, and under the No Action proposal potential soil exposures would not be further controlled (e.g., by access restrictions or soil capping), it seems that the MTCA threshold requirement for protectiveness (see WAC 173-340-360(2)) is not met. This requires more discussion by Ecology, including the representativeness of the data, the degree of exceedance of acceptable risk levels, and the possibility for comparatively focused cleanup actions (small areas), community interests, and applicability of the threshold requirement for protectiveness of human health at these open space units.

7. Our discussions with Ecology and the companies during this comment period clarified and confirmed our understanding that the proposed cleanup approach is intended to be a "mass excavation" approach, without attempts to fine-tune areas of surficial soils to be scraped based on the available site characterization data. Implementation of such a "mass excavation" approach simplifies many aspects of the proposed cleanup actions, requiring primarily only that appropriate compliance monitoring data show that the depth of scraping was adequate to meet

the cleanup criteria. Thus, even if statistical data evaluations show that a given RU exceeds applicable criteria only because the "x2" or "10 percent" statistical criteria are exceeded (see HHRA Chapter 4), we understand that soils over the entire unit will be excavated.

This clarification is critical to an accurate understanding of the planned cleanup action as several statements in the documents could be interpreted as invoking an approach to cleanup other than "mass excavation" and caused us some confusion in our initial reading of the documents; this was only clarified after meetings and discussion with WDOE and the PLP representatives. Some examples which we noted are:

- In section 6.2.1 of the DCAP the text states that excavations will be performed "in impacted areas as delineated by the RI sample data or by additional sample data", suggesting that areas to be excavated will be determined by the details of characterization data.

- This statement is repeated in section 7.2.2 of the FS, where a description of the use of analytical field screening is also presented: "Where necessary, field-screening samples will be collected to guide the cleanup action and allow for more cost-effective excavation of the impacted soil".

- In section 3.3 of the FS, the following statement occurs regarding actual soil volumes to be scraped: "Volumes reported below are pre-remedy estimates. The actual amount of soil excavated during the cleanup action will increase or decrease based on...actual field sampling data obtained during the cleanup action...". This suggests that sampling data could be used to decrease areas of excavation.

- In section 8.2 of the FS, the preferred alternative is discussed. That text describes actions for the non-PA areas within golf course RUs as follows: "Any soils in these areas that are above the commercial remediation levels used in the RA will be excavated and placed within the PAs".

These descriptions (and perhaps other similar statements) appear to be at odds with the simpler approach of a "mass excavation". We recommend that text revisions be made as needed to present a consistent description of the "mass excavation" approach.

8. Chapter 3 of the FS provides estimates of volumes of soil for remediation based on detailed evaluations of site data. This discussion may not be intended to provide soil volume estimates that apply to the selected preferred alternative using a "mass excavation" approach, but there are no other volume (or area) estimates in the documents that do apply to the preferred alternative. Therefore the Chapter 3 information presentations such as the identification of only 263 out of 336 acres of commercial RUs as requiring soil excavation are confusing (see FS Table 3-1).

For clarity, we recommend that the FS provide information on the total areas that are proposed to be scraped under the preferred alternative and provide a discussion of any and all areas not to be excavated and the rationale for their omission. Thus, areas already addressed by ISR actions may not be included (although the completeness of those actions may need to be reviewed if any of the cleanup levels or remediation levels used to make the original decisions are revised downward). Similarly, the acreages within designated placement areas of the golf course RUs may not have to be excavated (they will effectively be capped in place). Some historic areas will also be capped in place without soil excavation.

This information could be presented simply for all of the areas where excavation is planned in a summary table.

9. The HHRA, section ES.4.2 states that except for the industrial land use area, soil remediation levels were calculated using the equations in WAC 173-340-740 (unrestricted land use soil cleanup standards). That section of the MTCA cleanup regulation specifies an acceptable cancer risk level of 1×10^{-6}. However, as noted in HHRA section 3.5.2.4 (see page 3-8), and in HHRA Appendix E tables, the commercial and golf course land use scenarios involving adult rather than child exposures actually use an acceptable cancer risk level of 1×10^{-5} (equal to the industrial land use value in WAC 173-340-745) for calculating site-specific cleanup levels or remediation levels.

We believe that the MTCA cleanup regulation as revised and amended (Feb 12, 2001 version) requires use of the 1×10^{-6} acceptable cancer risk level for all non-industrial exposure scenarios, even if only adults are involved. (As noted in HHRA Appendix C, section C.2, Attachment #1, previous Ecology guidance may have differed). Ecology should confirm the MTCA requirements in this regard and their application to the DuPont Site. Use of the stricter acceptable cancer risk level would result in lowering calculated cleanup or remediation levels by a factor of 10. (See HHRA Appendix E tables; for example, the cancer-risk based remediation level for soil arsenic for commercial and golf course worker scenarios would be 61 ppm divided by 10, or 6.1 ppm - which would default to MTCA's assumed background concentration of 20 ppm). We note that WAC 173-340-357(c) states that the acceptable risk level for remediation levels shall be the same as that used for the cleanup level.

We also note that the HHRA actually uses the 1×10^{-6} acceptable cancer risk level to identify EUs that need to be addressed in the FS (see Tables 4-6 and 4-8). It states in section 4.2.2 (page 4-1) the following MTCA risk-based criterion: "The human health risk level for individual constituents may not exceed...a cancer risk of one-in-a-million (1E-06) for historical, open space, golf course, and commercial EUs". This approach, which we believe matches the requirements under the current MTCA cleanup regulation, is not consistent with the approach

for calculating cleanup levels and remediation levels using a 1×10^{-5} acceptable cancer risk level.

10. Our reading of the reports leads us to believe that site-specific remediation levels were developed with an assumption that they replaced, or "took precedence over", MTCA (default) cleanup levels. This is not consistent with our understanding of the role of remediation levels under MTCA (see especially WAC 173-340-355 - "Remediation levels are not the same as cleanup levels" - and 173-340-708(10)). Cleanup levels must be established for every site (WAC 173-340-355(2)); remediation levels establish concentrations above which certain specified (often more costly) actions will be applied, but some actions - including containment (e.g., consolidation and capping) and institutional controls - are required to address any hazardous substances exceeding the cleanup levels. (See the examples in WAC 173-340-355). Where an alternate RME scenario is used to derive remediation levels, they generally define the concentrations below which only institutional controls (to maintain the alternate RME scenario exposures as reasonable, excluding others) are required.

    Cleanup versus remediation levels does not appear to us to be a matter of "either/or", but rather a question of "both". The mixing of cleanup and remediation levels (and the implicit dropping of some of the applicable, underlying cleanup levels) in the summary tables in the reports seems to us confusing. We believe the presentation would be much clearer if all of the cleanup levels were first identified and summarized, followed by the site-specific remediation levels being used to identify specific components of the proposed cleanup actions.

11. There are actually two golf course worker scenarios used for calculation of site-specific remediation levels in the golf course land use RUs. The first one is equivalent to the commercial worker scenario in the parameter values chosen, and is used to define soil contaminant levels that need to be consolidated and capped in the golf course placement areas. The second one uses lower soil contact rate and exposure frequency parameter values and is used to calculate remediation levels for removal and offsite disposal of more highly contaminated soils (see HHRA Appendix C, section C.2, Attachment #1; see also FS Appendix H).

    Only the results for the first golf course exposure scenario are included in many of various summary tables of cleanup levels and remediation levels (e.g., see HHRA Table ES-1 and Table 3-7; DCAP Table 4-1 includes both). However, in many places in the text, discussions of the golf course worker scenario and calculated golf course remediation levels actually refer to the second description whose results are not included in the summary tables. This resulted in some unnecessary confusion. We recommend that both golf course exposure scenarios, suitably labeled, be included in all of the summary tables so that text references can be made clearer.

12. Evaluations of all soils data over a depth interval as broad as 1 to 15 feet are too broad to reflect realistic exposure scenarios. Soil contamination levels of potential concern may frequently be diluted by the inclusion of additional data not reflecting a similar probability of soil contact; for example, a contaminated 1 to 2 foot layer exceeding established cleanup levels may be "statistically diluted" to appear much lower. We recommend that the discussions of results for data from the broad 1 to 15 foot depth interval be characterized as generally descriptive rather than as a detailed exposure assessment. It can be noted that the ultimate decisions on depths of soil excavation will be made based on sampling results for small, surficial depth intervals (6 inches; see DCAP section 6.6.2) during compliance monitoring.

13. The HHRA screens detected contaminants at the site to identify constituents of possible concern for the soil-to-ground water pathway. The results (see HHRA section 2.5.2.1 and Tables 2-3 through 2-6) identify a list of constituents for this pathway. The HHRA states that remediation options for these COPCs are presented in the FS. However, only one constituent is actually discussed in the FS for ground water. The FS at section 1.4.3 states only that the RI and RA identify only one constituent exceeding drinking water standards (DNT).

    A brief discussion should be added to the FS presenting the rationale for dismissing the list of constituents in HHRA Table 2-6 and the soil-to-ground water pathway. Presumably this rationale will be based on ground water monitoring results; the locations of monitoring wells versus soil locations with constituents above soil-to-ground water criteria values should be included in the discussion.

14. USEPA has issued guidance for the IEUBK lead model stating that soils data used with the model should be obtained through chemical analysis of the <250 um (<0.25 mm) particle size fraction. We have already provided you with reference information from USEPA Region 10 staff, and a citation to an EPA website, on this issue. The concentrations for lead (and arsenic) are generally assumed to increase as the particle size fraction of soils decreases. For the DuPont site, the FS provides size-fraction data that confirm this increase in concentration with smaller particle sizes (see FS Appendix C for lead, especially Table C-3; for even more detailed arsenic data, see FS Appendix D). The result of using data from the standard MTCA analyses of <2mm soil particles in the lead model, as at the DuPont site, instead of EPA-recommended <0.25 mm data, is that exposures and risks are biased low. Calculated soil cleanup or remediation levels using the IEUBK model that are met using <2mm soil lead data could in fact be exceeded using <0.25 mm data for the same samples.

    The current MTCA cleanup regulation requirement to analyze the <2mm size fraction of soils (see WAC 173-340-740(7) (a)) is thus inconsistent with EPA guidance for use of the IEUBK model. This issue has already been raised with the Ecology policy section (e.g., in connection with the Area Wide Task Force

process, which also addresses soil contamination by lead and arsenic). We believe Ecology needs to make a policy decision on how to incorporate EPA's guidance for using the IEUBK model under MTCA. In fact, similar scientific (exposure assessment) issues are raised for the soil ingestion pathway for constituents other than lead, including arsenic, since the primary question is what particle sizes of soils (and dusts) is being ingested.

The relationship between soil particle sizes and lead concentrations has been established scientifically; we have site-specific information for the DuPont Site. At a minimum, this information should be used to provide an uncertainty discussion for the IEUBK results as applied to compliance with site-specific cleanup or remediation levels for soil (i.e., bringing together the EPA guidance and the FS Appendix C results). The HHRA would in fact be improved if a general section on uncertainty was added, so that Ecology could make risk management decisions based on a more complete characterization of the state of knowledge.

We also recommend that Ecology carefully consider the available information on lead concentrations by particle size and EPA's guidance for the IEUBK model in reviewing and approving the detailed sampling and analytical protocols for compliance monitoring of soil cleanup actions. The uncertainties in the current HHRA regarding lead risks because soil lead data represent the <2mm size fraction would be of little consequence if compliance monitoring data were collected based on analysis of the <0.25 mm fraction.

15. Development of the proposed cleanup plan for the DuPont Site has proceeded over a period of many years. The reports include as attachments a number of documents completed some time ago (see especially the HHRA, Appendix C materials) that provide supporting information. Those materials are very helpful in understanding the development of various aspects of the proposed cleanup plan. However, because the attached materials are dated, they are in some respects no longer consistent with or representative of the rest of the information presented in the reports. For example, summaries of DNT data from ground water monitoring wells are not current with the complete database provided in the RI report, and the exposure parameters used to calculate TPH soil cleanup levels are not consistent with the exposure parameters ultimately used for the rest of the HHRA evaluations and development of other cleanup and remediation levels.

We recommend that a general statement be added to reflect an understanding that some of the details in the appended materials are inconsistent because of the time at which they were originally prepared, but that those inconsistencies do not affect the selection of the preferred cleanup alternative. In addition footnotes could be placed wherever appropriate to clarify this question. Issues affecting the calculation of cleanup or remediation levels (still listed in the summary tables, e.g. Table 4-1 of the DCAP) are of somewhat more concern, but may still be addressed in ways that do not require rewriting the appendix materials (e.g., to

note that soil TPH remediation was accomplished to concentrations well below the original calculated cleanup levels).

16. The elevated regional soil arsenic concentrations are the result of releases from the former Tacoma Copper Smelter, as determined from regional soil sampling studies under the Tacoma Smelter Plume site investigations. The background concentration for soil arsenic as determined from sampling near the DuPont Site (32 ppm) therefore represents an area background rather than a natural background value (see WAC 173-340-200 definitions), as noted at HHRA section ES 4.4.

    Under MTCA, natural background but not area background concentrations can be used to constrain soil cleanup levels (see WAC 173-340-740(5) (c), 173-340-700(6) (d), and 173-340-705(6)). If cleanup of portions of a site below area background levels would result in recontamination, cleanup actions may be delayed but not eliminated (see WAC 173-340-360(4)(d)); under those circumstances, the remedial action shall be considered an interim action until cleanup levels are attained.

    The DuPont Site reports use the 32 ppm "background" concentration for soil arsenic as a cleanup level or remediation level (e.g., see DCAP Table 4-1); compliance with that criterion is assumed to establish completion of a final cleanup action with respect to soil arsenic for specified RUs. This appears to be inconsistent with the MTCA cleanup regulation provisions related to the two types of background concentrations, and could affect the selected cleanup levels for soil arsenic. Ecology should review the application of these sections of the MTCA cleanup regulation to the DuPont Site.

17. We recognize that the companies and Ecology have had long discussions regarding ecological risk assessment and the development of criteria for protection of the environment. The HHRA identifies lead as the only constituent of concern for ecological risks and establishes a criterion value of 118 ppm lead in soil (see HHRA section 3.4; see WAC 173-340, Table 749-3). In HHRA Appendix A the exclusion of arsenic, the other widespread soil contaminant at the DuPont site, as a constituent for ecological evaluation is explained as follows: "Human health standards for arsenic are protective of ecological organisms. Therefore, remediating arsenic contamination to meet human health standards will ensure protection for ecological receptors". In this statement it is unclear to us whether the human health standards for arsenic being referred to are the typical Method B values, defaulting to assumed natural background of 20 ppm, or the higher remediation levels proposed for the DuPont Site (DCAP Table 4-1).

    We recommend that the discussion in HHRA Appendix A regarding the exclusion of arsenic as a constituent for ecological risk assessment be expanded somewhat for clarity. Following the approach used for lead, and assuming that surficial soil arsenic would be present as arsenic V (unsaturated, aerobic conditions) for

example, it might be sufficient to note that the MTCA Table 749-3 value for wildlife of 132 ppm is higher than any of the proposed soil arsenic remediation levels based on protection of human health, and that arsenic may therefore be eliminated.

18. Were any constituents detected at the DuPont Site eliminated as COPCs, or assigned to a No Action alternative, because they were not known to be associated with historic site activities? Some comments in the text (e.g., see FS section 7.6.1) suggested to us that certain detected constituents (particularly at MSUs) were eliminated from further consideration using a criterion requiring historic association with site activities. Since the MTCA definition of facility (equivalently, site) includes places where "hazardous substances...have come to be located" (WAC 173-340-200), Ecology should (in the DCAP) discuss and provide the policy rationale for elimination of any constituents from further consideration because they are not known to have been associated with historic site activities.

19. Compliance monitoring sampling for soils is described in DCAP section 6.6.2. Composite sampling (5-to-1) is proposed for MSUs. Discrete sampling (point sampling) is proposed for cells within each of the larger RUs. We recommend that Ecology adopt a small composite sampling approach for the cells (approximately one-half acre in size) in the larger RUs, with compositing ratios of no more than 5-to-1. Detailed sampling protocols (e.g., random sampling versus center of cell and along four diagonals, etc.) can be identified in later compliance monitoring sampling and analysis plans. Remediation results will be made for each cell on an all-or-none basis. In the balancing between representativeness and detectability of remaining contamination (more locations are better) and possible dilution of results, we favor better representativeness. The exposure scenarios in the risk evaluations involve long-term exposures for which average rather than peak concentrations are of primary interest. If there are "hot spots" with higher concentrations remaining, they are more likely to be found with 5 sampling locations rather than 1.

    The DCAP (see section 6.2.2) proposes not to perform any statistical data evaluations, but rather proposes to simply compare single results to applicable cleanup or remediation levels (Composite sampling techniques will also provide only a single analytical result). This constitutes an alternate statistical method for evaluating compliance under MTCA. The DCAP should include a discussion and rationale for this alternate statistical approach (compare to the Everett Smelter Site FCAP, which similarly involved decisions on a very large number of decision units).

20. Ecology has noted that the screening for contaminants of potential concern included an evaluation of possible fish consumption exposures and risks using representative tribal (subsistence) fish consumption rates that are higher than MTCA default values. Those results are not presented in the HHRA. They

should be added (e.g., in section 2.5 and Appendix C). We understand that the results showed no significant risks and would not in any event affect the selected approach for ground water remediation (e.g., natural attenuation) at the DuPont site.

21. Neither the CAP nor the Consent Decree reference the Memorandum of Agreement (MOA 2000) between Weyerhaeuser Company, Weyerhaeuser Real Estate Company, Nisqually Point Defense Fund, Committee for the Preservation of the Nisqually Mission Historical Site, Nisqually Delta Association and the DuPont Historical Society. This MOA was developed during negotiations that ran through the year 2000. The MOA 2000 develops a framework for the establishment of a National Historic District along the banks of the Sequalitchew Creek. That agreement grew out of dialog between the PLP's, the City of DuPont and a variety of citizen groups regarding the preservation of historic resources in and around the Consent Decree Area. The MOA 2000 provides specific provisions which impact, to some measure, the scope and location of cleanup activities. We therefore believe it is important that this agreement be referenced in both the Consent Decree and the Cleanup Action Plan.

22. In Section 2.6 of the DCAP, reference is made to historical resources in the Consent Decree Area, and four are listed. The DCAP then proceeds to explain that the 3 sites comprise 4 acres (which 3 are being referred to is not defined): this is confusing. Is this discrepancy reflective of all recent agreements on preservation of buffers on the three sites indicted on Figure 2.1? The MOA 2000 allows for a one acre Methodist/Episcopal Mission site. Is that the acre which is not included? That seems to be the case, given the statement in that same section that the "size and location" of the Mission Site is not known.

The site itself was in fact identified and was long ago marked by the first private citizen to own the property (a former Hudson's Bay Company employee), and a series of memorials, ever more substantial, have been maintained ever since to mark that place. We request that the location of that marker be indicated on Figure 2.1, and that this discrepancy be clearly resolved in the final documents.

Earlier in the cleanup process, there was an unfortunate incident where the concrete and bronze marker that memorializes the Methodist/Episcopal Mission site was temporarily removed. While it has been returned to something close to its original location, we have received numerous expressions of concern that the exact location of that mark be accurately reestablished, mapped and documented in a manner which will assure it will not be lost during the cleanup process.

Understanding that the area where the marker sits is not intended to be included in the mass excavation efforts, it still seems to us a reasonable concern that heavy equipment operation in the area might (once again) disturb the marker. We would therefore request that the exact latitude and longitude of the marker be recorded in the DCAP, and that the spot be indicated on Figure 2.1. We would also request

that the State Office of Historic Preservation be asked to confirm that the marker location they have recorded from earlier investigations corresponds with the relocated marker coordinates. We would also note that we have heard again from citizens interested in historic preservation that there is still potential for further archeological investigation around that site. We are therefore forwarding a request that a non-invasive preliminary investigation be allowed to build on the site studies conduced by Guy Moura in 1989. This would certainly assist in accurately replacing that marker.

23. Future land uses discussed in section 1.5 of the Feasibility Study describe land use areas divided at Sequalitchew Creek, with only industrial uses to the north, and commercial, historical and recreational uses to the south. We would point out that the Methodist/Episcopal Mission Site is to the north of Sequalitchew creek (in the area designated for industrial land use). According to the MOA 2000 Weyerhaeuser has committed to commemorate that site, and connect that memorial to other Historic District sites by a trail system. Additionally Weyerhaeuser has agreed to allow a historic preservation organization to purchase a one acre or greater site in commemoration of the Mission. We therefore believe this section should reflect those agreements.

We also would appreciate more discussion addressing remediation measures around (and over) historic sites. In particular it would be appropriate to clarify in this discussion the appropriateness of the cleanup levels to be applied to the historic sites in relation to their land use and surrounding land uses.

Editorial Comments.

1. See DCAP language at section 4.4.5. The concentrations of all identified hazardous substances will not be below the cleanup levels or remediation levels after the proposed actions are complete, as stated. For example, some soil results for the open space remediation units exceed those values, but no action is proposed for all open space units. Ground water DNT concentrations may continue to exceed the 0.13 ug/L screening level for some time (no projected time for compliance is provided).

2. See DCAP language at section 4.3. Remediation levels do not "take precedence" over cleanup levels, as stated. See WAC 173-340-355(2) and (3). Where remediation levels are developed that exceed cleanup levels, some action (e.g., continuing institutional controls, or long-term containment) is still needed to address remaining contamination between the cleanup levels and remediation levels. Establishing a remediation level does not replace the underlying cleanup level.

3. See DCAP statement at section 6.1.3 that the open space remediation units "currently meet cleanup standards for the protection of human health". This

statement is inconsistent with the results presented in the HHRA report that none of the open space RUs is in compliance (e.g., see Table 4-4 of the HHRA, as well as Tables 4-7 and 4-8).

4. The reports include conflicting statements regarding time trends for DNT in ground water monitoring wells. For example, see pages 1-3 and 7-18 in the draft FS report and page 3-18 in the draft RI report. Given the variability in DNT concentrations at individual wells over time, any time trends are not obvious. Any conclusions regarding time trends should be supported by proper statistical data evaluations (see, for example, Statistical Methods for Environmental Pollution Monitoring by R.O. Gilbert, Van Nostrand Reinhold 1987 for applicable non-parametric trend tests).

5. See HHRA report, Table 4-6. The table appears to be missing a line for exposure unit OS1.

6. See DCAP language at section 5.6.1. Removal of contaminated soils from the site would eliminate potential (onsite) exposure pathways to the contaminated soils. However, consolidation and containment (with a cap/cover system) serve to control rather than eliminate the soil exposure pathways. The golf course maintenance worker scenario estimates exposures based on continued (limited) soil contact. Long-term inspection and maintenance of the containment system will continue to control potential soil exposures. Control rather than elimination is a better description, since disruption of the cap/cover could still result in exposure to contaminated soils. Use of the term control is consistent with the requirement, as noted in section 5.6.1, for long-term maintenance of the containment system. The elimination of an exposure pathway, on the other hand, would require no long-term actions.

7. See DCAP language at section 6.2.2 regarding glacial kettles (and also see FS at page 7-3). This statement seems to indicate that surface soils may be directly pushed into glacial kettles outside of the placement areas. We assume that if possibly contaminated surface soils are placed into a glacial kettle, and that glacial kettle is outside of a designated placement area, that the kettle would in effect become another placement area and a cap/cover would be installed. We suggest that the process of filling any onsite glacial kettles be described in more detail to avoid any misinterpretation.

8. See DCAP language at section 6.6.1 regarding cap/cover depth as a human health barrier. The second golf course worker exposure scenario (for calculation of remediation levels above which soils would be taken offsite rather than left in the placement areas) assumes some limited contact with contaminated materials below the human health barrier. If the barrier is constructed based on the "maximum depth in which a golf course worker is expected to excavate", then no contact with contaminated soils below the barrier would occur. This minor inconsistency should be resolved.

9. See FS Table C-3. Under the column for Area 40 (Packhouse) data, the entry for total lead is given as 30,000 mg/kg. This appears to be a typo. It is inconsistent with the concentrations by size fractions, entered in the same data block. See the text on page C-6, which indicates the 30,000 mg/kg value should perhaps be 3,000 mg/kg.

10. See FS pages ES-2 and 1-2. There appears to be a minor inconsistency in the figures given at these two locations for the volume of soils removed during Interim Source Removal actions (72,000 tons versus 63,393 tons).

11. How many small MSUs are there? The text at FS page ES-3 states that there are 49, while FS Fig 1-3 shows more than 70. Have some of the MSUs shown on Figure 1-3 already been cleaned up, accounting for the smaller count given in the text? See also DCAP Figure 6-2 which shows a smaller number of MSUs than FS Figure 1-3, and a different system of identifying labels.

12. See FS page 3-1. The figure given for acres of open space land uses - 12.9 acres - appears to be in error. Compare the figure of 73.21 acres (including 22.35 acres of Old Fort Lake) given in Table 2-1 of the HHRA report.

13. See FS page 3-2 in section 3.4, second paragraph. The paragraph discusses excavation depths. In the second sentence, the term "actual lateral extent" appears to refer to depths rather than lateral (horizontal) extent, and should be reworded.

14. See FS page 4-3 (and elsewhere) with discussion of obtaining permits as part of implementability. Under MTCA, it is not necessary to obtain permits, only to demonstrate substantive compliance with permit conditions that would otherwise be required.

15. See FS page 7-3, the last sentence of the paragraph under the heading Cap Construction. If additional areas of the golf course Remediation Units, outside the designated Placement Areas, are given a cap/cover system to contain contaminated soils, this would in effect just result in an enlargement of the designated Placement Areas. We assume that the circumstances under which additional small, non-contiguous Placement Areas would be created are limited; long-term management of the containment system will likely be easier if the number and locations of Placement Areas are kept from proliferating.

16. See FS page 7-11 at section 7.4 and Table 7-5. The alternatives scores appear to range from 1 to 4 rather than 1 to 5, as stated. As in any detailed ranking or evaluation methodology, it is possible to raise questions about some of the details. For example, from the point of view of area residents, it is very likely that the most favored alternative for long-term effectiveness and permanence would be offsite disposal of all soils contaminated above cleanup levels, even though Table 7-5 shows that alternative to be marginally less preferred than the wet screening

alternative. Nevertheless, the outcome of the overall detailed evaluation process resulting in the proposed onsite consolidation and containment approach appears reasonable.

17. See FS at pages 7-7 and 7-15 (and elsewhere). The evaluation criteria for perimeter dust monitoring data (e.g., allowable concentrations for airborne particulate arsenic and lead), and the acceptable calculated risk levels, should be identified no later than the implementation work plans for the cleanup actions. Corrective actions in case of exceedances of those criteria should also be identified. Such evaluation criteria have been used at the Tacoma Smelter and Everett Smelter sites, among others.

18. See FS pages 7-7 and 7-15. The text on page 7-7 should indicate that perimeter dust monitoring will be required for activities along the southern and eastern boundaries, as stated on page 7-15.

19. See FS table 8-1. The best estimate costs for the miscellaneous small units table (at bottom) are outside the range of low-to-high estimated costs. The high cost and best estimate cost columns may be transposed.

20. See DCAP sections 6.3.6 and 6.3.7 and Figure 6-3. Figure 6-3 shows a set of discontinuous NGRR segments that are identified as (remaining) MSUs to be addressed by final cleanup actions - either cap/cover in place or consolidate into placement areas and then cap/cover. We assume, as indicated by the text at section 6.3.7, that all other NGRR segments not shown on Figure 1-3 have already been remediated during ISR actions. Are there any segments of the total NGRR system at which no action will have been taken by completion of the cleanup actions? If so, on what basis was that decision made? We assume that even if a short segment of the NGRR system has soil sampling data whose evaluations show no exceedances of cleanup levels/remediation levels, the mass excavation approach will still result in soils being consolidated into the placement areas (or capped in place). The best assumption from historical information appears to be that (lead arsenate) herbicides were probably applied throughout the NGRR system.

21. See FS page 8-2 under the Open Space RUs text. The discussion of open space Remediation Units states that there are 3 such units. The DCAP and HHRA reports identify 4 open space units; apparently the subdivision of South Sequalitchew Creek into OS-2 and OS-3 is not reflected in the FS text at page 8-2. (Compare HHRA Table 2-1 and DCAP Figure 6-1).

    See FS page 8-2 under the Commercial RUs text. "Following the excavation of these soils, the resulting surface soils will be sampled and if found to be statistically above the remediation level for the golf course land use, re-excavated". The reference to remediation level for the golf course land use should be changed to refer to commercial land use (the type of RUs addressed in

this paragraph). The proposed approach to evaluation of soils compliance monitoring data (see DCAP at section 6.6.2) does not involve calculation of the typical MTCA statistics; the word "statistical" should be removed from the quoted sentence on FS page 8-2 for consistency and to avoid misinterpretation. The sentence as revised would read: "Following the excavation of these soils, the resulting surface soils will be sampled and if found to be above the remediation level for the commercial land use, re-excavated".

We note that the term re-excavated implies actually digging up areas already dug up and filled for a second time, rather than digging further, and found this terminology unclear. Therefore we suggest discussing this step in terms of additional excavation.

22. One of the main rationales for identifying MSUs, given the proposed mass excavation approach, is to locate and identify soils that could have higher concentrations of arsenic or lead, or contain other contaminants, resulting in selection of offsite disposal actions for cleanup (see DCAP section 6.3). A preliminary estimate of the total volume and number of truck loads of soils to be handled by offsite disposal should be given in the DCAP.

23. DCAP section 3.1.1 and Figure 6-2 have different lists of contaminants associated with the MSUs. This inconsistency should be resolved. If any identified contaminants of potential concern have been dropped from the DCAP discussion because they have been fully addressed by prior ISR actions, those contaminants should be listed and so identified (in text, figure legends, or tables as appropriate).

24. See DCAP section 3.4. What data were used to characterize Puget Sound background sediments? NOAA has used data collected very near the site (Nisqually Reach) to characterize background values. See Meador, James P. et al., 1994. NOAA Technical Memorandum NMFS-NWFSC-16, National Status and Trends Program. National Benthic Surveillance Project: Pacific Coast, Analysis of Elements in Sediment and Tissue, Cycles I to V (1984-88).

25. See summary tables for cleanup levels and remediation levels (e.g., DCAP Table 4-1 and HHRA Table ES-1). The soil mercury values of 24 ppm are variously noted as being based on agreement with Ecology or site-specific exposure factors approved by Ecology. We note that the standard default Method B soil cleanup level for mercury under MTCA, based on direct contact exposures (ingestion) and non-carcinogenic risks, is also 24 ppm (see Ecology's CLARC manual). Calculations of risk-based remediation levels using adjusted exposure parameters would result in a value higher than 24 ppm. Our discussions with Ecology and the companies suggested that the listed 24 ppm values for mercury might reflect soil-to-ground water pathway calculations. The basis for the listed 24 ppm values should be reviewed and correctly given in the table notes. (See HHRA Appendix C.4 which discusses mercury. Our impression is that the default human health cleanup level of 24 ppm was screened to determine if it would also be protective

of ground water, and was found to be protective. The referenced Mercury Cleanup Levels Summary Report is not attached and therefore could not be reviewed. If our impression is correct, then the listed 24 ppm cleanup level would actually be the default human health criterion).

26. See DCAP section 6.3.5 discussing MSUs of historic importance. We understand the primary objective for proposed cleanup actions at these locations to be preservation of potentially important historic and cultural artifacts. Installation of a cap/cover system would meet that objective. The use of excavation and consolidation approaches, given the possible presence of artifacts, seems to have a potential for undue disturbance; how it meets the primary objective, or the constraints under which it may be used, warrants somewhat more detailed description.

27. There is confusing language in the documents regarding how confirmational monitoring and archeological monitoring will take place at the MSUs. After discussion with WDOE and the PLPs we understand that all the same procedures are to be applied at the MSUs as for other RUs. Therefore we recommend that this be clarified in the appropriate discussions regarding MSUs.

Summary.

In prior reviews of documents for the Former DuPont Works Site we have identified major issues and concerns. Over the past several years many of these concerns have been successfully addressed through modifications to the remedial approach for the site.

While many of the comments presented in this letter are still significant in terms of substance and the need for clarification we anticipate, if our understandings as discussed above are correct, that most of the comments will be addressed simply through appropriate clarifications or future contingency planning regarding the actions to be implemented.

It is our sincere hope that these comments and the input provided over the past 8 years by the DTCOP and its consultants has been helpful in bringing this important remediation project to completion. Thank you for the opportunity to provide input at this stage of the project.

Sincerely Yours,

Tom Skjervold

Ed Kenney

Calvin A. Page
1837 Palisade Boulevard
DuPont, WA 98327

April 14, 2003

Mr. Mike Blum
Washington State Dept. of Ecology
P.O. Box 4775
Olympia, WA 98504

Re: DuPont Consent Decree

Ladies and Gentlemen:

I have been a DuPont resident for the past six years and have regularly participated in the many briefing sessions held on site. Prior to retirement, I was employed in several capacities as a professional microbiologist, college professor, pharmaceutical research management, and as CEO of domestic and off-shore technology oriented companies. These responsibilities have provided an intimate knowledge of toxicological procedures as well as ecological impacts of a wide variety of waste products.

I have been particularly impressed with the program and execution of Weyerhaeuser Company and the E.I. duPont de Nemours Company. They have been open, cooperative and concerned while working well with regulatory representatives. It is, therefore, with great pleasure that I recommend approval of this project at the earliest possible date.

As a sidelight, I am very familiar with the ecological/toxicological properties of the primary contaminants associated with the clean-up of the former DuPont Munitions factory. Besides my technical career, I had personal association with both materials while being one of ten farm children in Minnesota.

First, our old farm house, our playing blocks, our kitchen furniture, and our cribs were coated with one or more coats of lead-based paint. Second, during the dust storms and grasshopper plagues of the mid-1930 era, we protected our crops by spreading a poison bran mixture which stopped the hopper invasion. I worked on this project for about three summers along with my father and brothers. The active ingredient was arsenic.

In both instances, the lead and arsenic exposure concentrations were significantly

higher than levels of these two materials found in soils in and around DuPont. My parents lived into the upper 80 years, and no child was injured by this exposure even though many were young enough to be considered at risk. Currently seven of us are still alive and all are over seventy years of age.

From all of this, my conclusion is that the planned Decree is excellent but it also represents significant and unnecessary over-kill. The costs and delays associated with this project to date is inexcusable. The Department of Ecology should consider the risk-benefit ratios during any and all controversies during the completion of this project and err on the side of financial justice.

Respectfully submitted,

Calvin A. Page, PhD

cc: Mr. Bob Martin , Weyerhaeuser Company
DuPont City Council
Mr. Jeff King, DuPont Company

CITY OF LACEY

Shaping our community together

POST OFFICE BOX 3400
LACEY, WA 98509-3400

February 18, 2003

Mike Blum, Site Manager
Ecology Southwest Regional Office
Toxics Cleanup Program
P.O. Box 47775
Olympia, WA 98504-7775

Dear Mr. Blum,

I was pleased to receive the January 2003 update on the Former DuPont Works. Thank you for keeping me on the mailing list. As a historian, I have a great interest in the heritage of the DuPont area.

What a heritage that is! Native Americans, Hudson's Bay Company employees, American settlers, US soldiers, and DuPont Company workers have all lived on the Former DuPont Works site. Their story reveals much about the development of the region.

I urge the Washington State Department of Ecology, the E.I. DuPont de Nemours Company, and the Weyerhaeuser Company to make a maximum effort during the Former DuPont Works site cleanup process to identify and preserve cultural resources that might be found. These archaeological materials could have unique and significant historical value. They are irreplaceable.

Sincerely,

Drew W. Crooks

Drew W. Crooks
Historian
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